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GENOME SHOCK AS A MEANS OF REPROGRAMMING GENOMES:

A. The multipotentials of a genome.

1. Caterpillar and moth. Two distinctive organisms from single genome: Programming systems.
2. Termites: winged males and females, neotenic adults, soldiers.
3. Migratory locusts: Solitary, non-migrating: pink to yellow
   Gregarious: lay few eggs. Green color
4. Aphids: sexual and parthenogenic
5. Ants: queens; workers, different types; soldiers.
6. Honey bees -queens, workers (females) drones.
7. Parasites: sequence of distinct types in different hosts in cycle.
8. Mimicry: different mimics from models in locality from single genome. Papilio species, females only. Different regions, different models and mimics.
9. Plant morphologies depending on environment. Sea coast to mountain. Growth chambers, Cornell, potato; distinctions depending on environment.

B. Multipotentials of genome in response to some earlier challenge to genome:

Plant galls and their significance

1. Vitus plant, cecidomyids; types of galls. (photo). Three distinctly galls on same plant; each from specific insect. Growth types. Extraordinary reprogramming.
2. Oak trees; oak galls and species specificity. Oak apple and wasp: the exceptional morphology of this gall (and those on other oaks.)
3. Nitrogen-fixation galls on roots; very specific organization
4. Teratomas: mixed up programming. Crown gall.

C. Direct response of genome to some types of shock. Two main classes

1. Programmed responses: Heat shock; repair of UV damage to DNA; repair of DNA replication mistakes; fusion of broken ends of chromosomes; telomere formations on ends of newly broken chromosomes.

2. Improvised responses to challenge.

   Tissue culture: animals=reorganized genome and chromosomes.
   plants=reorganized genome, several levels. New plants.

   Strain crosses: Drosophila hybrid dysgenesis: reorganizations.
   The initial response followed by quieting down.

   Species crosses: Frogs, chromosome alterations.
   Nicotiana species crosses: N. tabacum x

   Poisons: plants near slag from mine: poison; recovery; change.
   Amoeba, infection, recovery, necessity.
   Amoeba nuclei transfered, two species. Amoeba strain isolated, crossed=like two species crosses (nuclear exchanges.)

   Methotraxate and other drugs with animal tissue cultures: Dihydrofolate reductase amplifications. What this means at the molecular level.

D. Evidence of responses to genome shock that occurred in origin of some species and genera.

1. Some of the above such as response of plant to insect egg laying: programmed in the past. Changes in Amoeba to "poison".
2. Mimicry Papilo; regional models.
3. Drosophila melanogaster and simulans: changes in locations and amounts of repetitious DNAs, not of known genes.
4. Most extraordinary:
   Muntjac deer. Muntiacus reevesi: chinese muntjak 2n=46 chromosomes. M. muntjak vaginalis, Indian muntjac 2n =6 in female, 7 in male. The origin
5. Types of changes observed in testes; fusion types. Maize fusion types.
6. Maize knobs-teosintes in Mexico vs teosintes in Guatemala; in other plants. Some special event, possibly related to diversity of maize.